

- 1 1. A composite membrane for a biosensor, comprising:
 - 2 an inner membrane layer;
 - 3 an outer membrane layer; and,
 - 4 an enzyme layer, said enzyme layer comprising a matrix comprising at least one
 - 5 enzyme, a cross-linking agent, and an enzyme stabilizer.
- 1 2. The composite membrane of claim 1, wherein said enzyme is lactate oxidase.
- 1 3. The composite membrane of claim 1, wherein said enzyme is creatinase.
- 1 4. The composite membrane of claim 1, wherein said enzyme is sarcosine oxidase.
- 1 5. The composite membrane of claim 1, wherein said enzyme is creatininase.
- 1 6. The composite membrane of claim 1, wherein said enzyme comprises a mixture of
2 creatinase and sarcosine oxidase.
- 1 7. The composite membrane of claim 1, wherein said enzyme comprises a mixture of
2 creatinase, creatininase and sarcosine oxidase.
- 1 8. A matrix for an enzyme sensor, comprising:
 - 2 lactate oxidase;

3 a cross-linking agent; and

4 a enzyme stabilizer.

1 9. The matrix of claim 8, wherein said matrix forms a cross-linked matrix of proteins
2 having enzymatic activity.

1 10. The matrix of claim 8, wherein said matrix forms an electrochemical electrode.

1 11. The matrix of claim 8, further comprising bovine serum albumin.

1 12. The matrix of claim 8, wherein said cross-linking agent comprises a dialdehyde.

1 13. The matrix of claim 12, wherein said cross-linking agent comprises glutaraldehyde.

1 14. The matrix of claim 13, wherein said cross-linking agent comprises 1-10%
2 glutaraldehyde by weight.

1 15. The matrix of claim 13, wherein said cross-linking agent is 5% glutaraldehyde by
2 weight.

1 16. The matrix of claim 8, wherein said cross-linking agent comprises a diisocyanato.

- 1 17. The matrix of claim 16, wherein said cross-linking agent comprises 1,4-
2 diisocyanatobutane.
- 1 18. The matrix of claim 8, wherein said cross-linking agent comprises a diepoxide.
- 1 19. The matrix of claim 18, wherein said cross-linking agent is selected from the group
2 consisting of 1,2,7,8-diepoxyoctane and 1,2,9,10-diepoxyldecane.
- 1 20. The matrix of claim 8, wherein said enzyme stabilizer is selected from the group
2 consisting of polyethyleneimine, polypropyleneimine, poly(N-vinylimidazole),
3 polyallylamine, polyvinylpyridine, polyvinylpyrrolidone, polylysine, protamine and their
4 derivatives.
- 1 21. The matrix of claim 20, wherein said enzyme stabilizer comprises 1-20%
2 polyethyleneimine by weight.
- 1 22. The matrix of claim 21, wherein said enzyme stabilizer comprises 5%
2 polyethyleneimine by weight.
- 1 23. A matrix for an enzyme sensor, comprising:
2 creatinase;
3 sarcosine oxidase;

- 1 a cross-linking agent; and,
- 2 an enzyme stabilizer.

1 24. The matrix of claim 23, further comprising creatininase.

1 25. The matrix of claim 23, wherein said matrix forms a cross-linked matrix of proteins
2 having enzymatic activity.

1 26. The matrix of claim 23, wherein said enzyme sensor comprises an electrochemical
2 electrode.

1 27. The matrix of claim 23, wherein said cross-linking agent comprises a dialdehyde.

1 28. The matrix of claim 27, wherein said cross-linking agent comprises glutaraldehyde.

1 29. The matrix of claim 28, wherein said cross-linking agent comprises 1-10%
2 glutaraldehyde by weight.

1 30. The matrix of claim 28, wherein said cross-linking agent is 5% glutaraldehyde by
2 weight.

1 31. The matrix of claim 23, wherein said cross-linking agent comprises a diisocyanato.

1 32. The matrix of claim 31, wherein said cross-linking agent comprises 1,4-
2 diisocyanatobutane.

1 33. The matrix of claim 23, wherein said cross-linking agent comprises a diepoxide.

1 34. The matrix of claim 33, wherein said cross-linking agent is selected from the group
2 consisting of 1,2,7,8-diepoxyoctane and 1,2,9,10-diepoxydecane.

1 35. The matrix of claim 23, wherein said enzyme stabilizer is selected from the group
2 consisting of polyethyleneimine, polypropyleneimine, poly(N-vinylimidazole),
3 polyallylamine, polyvinylpyridine, polyvinylpyrrolidone, polylysine, protamine and their
4 derivatives.

1 36. The matrix of claim 35, wherein said enzyme stabilizer comprises 1-20% poly(N-
2 vinylimidazole) by weight.

1 37. The matrix of claim 36, wherein said enzyme stabilizer comprises 5% poly(N-
2 vinylimidazole) by weight.

1 38. A matrix for an enzyme sensor comprising:
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- 3 at least one enzyme selected from the group consisting of lactate oxidase, creatinase,
- 4 sarcosine oxidase and creatininase;
- 5 a cross-linking agent; and,
- 6 an enzyme stabilizer.

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